

Clinical Chemistry's NIH Book Club Corner

NIH Biomedical Computing Interest Group Book Club Review of *How Doctors Think* by Jerome Groopman. Jim DeLeo, Alan T. Remaley, G. William Moore, Gerald L. McLaughlin, Ellen J. Bicknell, and Melanie Swan.

This book explores how physicians make difficult diagnoses. Cognitive processes, not merely learning correlations between symptoms and diseases, must be an integral part of clinical medicine. We are introduced to a woman with abdominal complaints, undiagnosed for more than 15 years. Finally, a physician carefully listens to her entire story, and makes the correct diagnosis. A patient with sudden shortness of breath is rescued by a visiting cardiologist, who quickly makes the diagnosis using pattern recognition and heuristics.

Most medical errors are mistakes in thinking. Patients may be misdiagnosed due to the physician's positive or negative social stereotypes. Errors may result from availability errors (recent experience) and confirmation bias (disregarding data inconsistent with one's first guess), according to economics Nobel laureates Tversky and Kahneman. Patients can assume active roles by asking questions and helping to shape physician thinking. The time that medical gatekeepers (general internists, general pediatricians, and family practitioners) spend talking with patients is undervalued. Cognitive bias (matching the patient to a familiar prototype), zebra retreat (avoiding a rare diagnosis), and diagnosis momentum (passing along a first-impression diagnosis to peers) point physicians to a misdiagnosis. Physicians should accept uncertainty as an intrinsic feature of medical practice. The author-as-patient consulted 6 surgeons for a long-standing hand ailment, received 4 different diag-

noses, and chose the surgeon with the best cognitive assessment. Current medical knowledge cannot entirely rely on evidence-based medicine and clinical trials for individual diagnoses and treatment. The author discusses errors that radiologists make in their practice, although similar errors are also made in other specialties. One problem may be an increase in the complexity and number of images that are now available for a given procedure, which may lead to a decrease in scrutiny of the individual images, particularly when compounded by a large increase in caseload. Pharmaceutical industry financial incentives contribute to the misdiagnosis of many patients each year. These companies relentlessly pursue physicians, by medicalizing new conditions in which health is not necessarily impaired, or where improvement is unlikely, leading to overtreatment. Physicians may uncritically apply classification schemes and algorithms without understanding the individual patient. Physicians fear failure, and may avoid "bad disease" cases that are unresponsive to routine therapy, and require trade-offs between pain control and aggressive therapy.

Most misguided care is a cascade of cognitive errors. There is no single script for making the correct diagnosis. The physician may need to repeat the physical examination. Physicians shouldn't repeat tests; physicians should doubt them. Physicians shouldn't depend upon Occam's Razor: some patients indeed have 2 diseases. The author admits producing psychosomatic symptoms in himself when he was a patient. After 30 years of practice, the author realizes that the patient can be his vital partner to help his thinking, by asking questions to protect him from the cognitive pitfalls that cause misguided care.

ABOUT THE AUTHOR

Jerome Groopman, MD, holds the Dina and Raphael Recanati Chair

of Medicine at Harvard Medical School, and is Chief of Experimental Medicine at Beth Israel Deaconess Medical Center, Boston. He received a BA from Columbia College, an MD from Columbia College of Physicians and Surgeons, and completed internship and residency in internal medicine at the Massachusetts General Hospital, followed by fellowships in hematology and oncology at the University of California and Children's Hospital and Sidney Farber Cancer Center, Harvard Medical School. Dr. Groopman is a staff writer in medicine and biology for the *New Yorker*, and the author of several books.

DIALOGUE QUESTIONS

What blind spots limit medical pedagogy, and the thinking of young vs experienced physicians? How could medical thinking be improved if physicians had immediate access to complete, legible records for their patients? GWM

How much improvement can we expect for individualized diagnoses and treatment when using techniques that incorporate evidence-based medicine, meta-analyses of trial results, case control experiments, and case studies? Can patient input improve computer-aided diagnoses? EJB

Wouldn't the same errors that physicians should avoid be even more prevalent among patients, and introduce even more errors than those made by physicians? Isn't a greater problem the resistance of physicians to learning and adapting more lab-based and computer-based clinical diagnoses? GLM

Given our still incomplete knowledge on the pathogenesis and the manifestations of many diseases, is it a surprise that the judgment of physicians can often be faulty? ATR

Do patients need anything aside from the questions suggested in the book to enable them to have a more equal relationship with physicians? MS

COMMENTARIES

This book is a collection of medical war stories that all American physicians hear during training. The book is well written and accurate, and presents “insider” material probably unfamiliar to the general public. Blind spots affect both patients and physicians themselves, who either downgrade or overlook important clues. The author has a cavalier attitude about statistical reasoning. Physicians depend on this reasoning to predict survival and side effects, even as they customize treatments for individual patients. The author also overlooks the comprehensive electronic health record. Considerable time and expense is squandered by repeating previously performed tests, reconstructing medical histories scattered about in paper charts, and simply trying to read illegible handwritten notes. GWM

The author states that diagnosis and treatment strategies must include a good physician-patient relationship. The author describes failures in patient-physician communication that lead to medical errors. However, the book ignores the modern medical knowledge and technology: the Internet, where the patient can learn about his/her disease; personal online medical records; and online support groups of similar patients. The evolution of physician thinking, as new technology and computer assistance is incorporated into medical protocols, deserves further attention. Nonetheless, his insights into the minds of both physicians and patients make this book worth reading. EJB

The author's examples suggest resistance to using lab-based, evidence-based, and especially clinical laboratory analysis-based information, which in most of his case studies would have given clearer diagnoses much earlier. Although the preference of physicians to avoid clinical laboratory data is discussed, the concept that this preference itself

is the main recurrent error in physician thinking still seems to be overlooked. Although objective evidence-based diagnosis is the claimed goal, comments about the inadequacy of lab-based tests to adequately inform, also suggests that future diagnostic infrastructures must be adapted to accommodate and progressively educate physicians, who are prone to both errors in thinking, and the error of dismissing lab-based or computer-based diagnostics as slow, expensive, and inconclusive. GLM

The insider's perspective of the author makes the book compelling not only to physicians but also to patients. The author reveals in a sympathetic and nonaccusatory manner how physicians can fall into various conceptual traps leading to a misdiagnosis. Better communication can lead to more satisfactory outcomes. I would have liked to see more discussion of newer computational approaches for assisting medical diagnosis, and more about pitfalls in interpreting clinical laboratory data, but overall the book provides a thorough insight into problems that beset the doctor-patient relationship. ATR

The quickly evolving pace of medicine renders the book slightly out-of-date. The author argues, based upon disaggregated case anecdotes, how cognitive biases contribute to misdiagnosis. Concepts of medicine and health have progressed rapidly. The author supports increased personalization, but not modern ideas of using targeted therapies based on genomic data; more systemic understanding of health involving prevention and detection; and patients who self-manage their health in consultation with physicians. The author promotes an empowered patient-physician relationship, in which misdiagnosis can be avoided through intent-uncovering questions, such as whether a proposed treatment is standard;

whether there are less invasive, simpler alternatives; and how the decision was made to prescribe a particular medication. MS

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